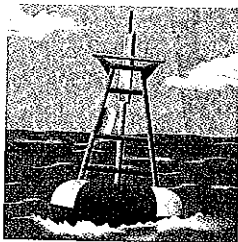


# Unit 5 Lesson 4A | Homework

1. One particular July 4th in Galveston, TX, high tide occurred at 9:36 A.M. At that time the water at the end of the 61st Street Pier was 2.7 meters deep. Low tide occurred at 3:48 P.M., at which time the water was only 2.1 meters deep. Assume that the depth of the water is a sinusoidal function of time with a period of half a lunar day (about 12 hours 24 minutes).

- (a) At what time on the 4th of July did the first low tide occur?
- (b) What was the approximate depth of the water at 6:00 A.M. and at 3:00 P.M. that day?
- (c) What was the first time on July 4th when the water was 2.4 meters deep?

2. **Motion of a Buoy** A signal buoy in the Chesapeake Bay bobs up and down with the height  $h$  of its transmitter (in feet) above sea level modeled by  $h = a \sin bt + 5$ . During a small squall its height varies from 1 ft to 9 ft and there are 3.5 sec from one 9-ft height to the next. What are the values of the constants  $a$  and  $b$ ?



3. **Ferris Wheel** A Ferris wheel 50 ft in diameter makes one revolution every 40 sec. If the center of the wheel is 30 ft above the ground, how long after reaching the low point is a rider 50 ft above the ground?

4. **Blood Pressure** The function  $P = 120 + 30 \sin 2\pi t$  models the blood pressure (in millimeters of mercury) for a person who has a (high) blood pressure of 150/90;  $t$  represents seconds.

- (a) What is the period of this function?
- (b) How many heartbeats are there each minute?
- (c) Graph this function to model a 10-sec time interval.